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Surveillance of Non-neoplastic Barrett's Esophagus and Application of the Prague-Classification[☆]

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Abstract

Barrett's Esophagus (BE) is an important premalignant condition that predisposes to adenocarcinoma and there is evidence that the extent of the Barrett's segment correlates with the risk of malignancy. The extent of the endoscopic findings is described by the Prague classification using the Prague *C* & *M* criteria (*C* is the circumferential length and *M* is the maximal length). The purpose of these criteria is to simplify and standardize endoscopic characterization of the extent and length of BE.

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Video related to this article

Video related to this article can be found online at <http://dx.doi.org/10.1016/j.vjgien.2013.10.005>.

1. Background

- Barrett's esophagus (BE) is an intestinal metaplasia of the distal esophagus that predisposes to the risk of esophageal adenocarcinoma. A recent study estimated the risk for developing adenocarcinoma in patients with Barrett's

esophagus to 0.59% per year [1]. Because of this risk endoscopic surveillance- and screening programs were implemented in many countries.

- There is accumulating evidence that the risk for developing cancer is directly linked to the Barrett's dimension [2]. The need to standardize the classification of Barrett esophagus lead to the development of a system known as the Prague classification of BE [3]
- In this classification, both the maximal length (*M*) (including tongues) of Barrett esophagus, as well as the length of the circumferential Barrett segment (*C*) are measured during endoscopy. The purpose of these criteria is to simplify and standardize endoscopic characterization of the extent and length of BE. The new system emphasizes the use of esophageal landmarks to assess the circumference (*C*) and maximal (*M*) extent of the endoscopically visualized BE segment.

[☆]The terms of this license also apply to the corresponding video.

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2. Materials

- High definition white light endoscope: EG-590 WR with FICE, Fujifilm Tokyo, Japan

3. Endoscopic procedure

- The key steps in Prague C & M Criteria are:
 1. identify the gastroesophageal junction (GEJ) as at the tops of the gastric mucosal folds; if hiatal hernia is present, do not confuse with the diaphragmatic hiatal impression for the GEJ;
 2. for circumferential columnar-appearing mucosa above the GEJ, define this extent in centimeters above the GEJ: report as the C-value; and
 3. for any tongue-like areas of columnar-appearing mucosa, measure the maximum extent in centimeters above the GEJ: report as the M-value.
- The M and C values of Prague classification can be used to track the length of the Barrett segment over time. In the vast majority of patients the length of the Barrett's esophagus does not change over time.
- It was agreed that true islands of squamous and columnar mucosa should not influence the measurement of extend.
- The grading systems which have been proposed previously include classification of BE into long (≥ 3 cm) and short (< 3 cm) segments. A very short metaplasia (< 1 cm) or histological diagnosed goblet cells is defined as an ultra-short-segment-Barrett's-esophagus (USSBE). This classification is still used by some guidelines for recommendation of surveillance strategy [4].

4. Key learning points and tips and tricks

- The risk for developing esophageal adenocarcinoma is strongly associated with the extent of the Barrett segment
- The Prague C & M Criteria give explicit guidance on the endoscopic recognition of BE and grading of its extent
- Depending on the total length, a subdivision into ultra-short-segment-Barrett's-esophagus, short-segment-Barrett's-esophagus and long-segment-Barrett's-esophagus is useful.

5. Scripted voiceover

Voiceover Text

This is a gastroscopy in a 55-year old patient who presented with clinical signs of gastro-esophageal-reflux disease. After insertion of the endoscope into the stomach, we start a slow withdrawal. The ends of the gastric folds represent the gastroesophageal junction. During retraction you can see the typical reddish appearance of a Barrett's esophagus. Some squamous epithelium spots are visible within the Barrett's segment at the 3 o'clock position.

Now you can see the whole dimension of the Barrett's esophagus. In the distal area the esophagus wall is

Voiceover Text

covered by metaplastic epithelium. We start measuring the extent of the Barrett's segment according to the validated Prague classification system.

First we measure the distance between the end of the gastric folds to the proximal end of the circumferential capped area. According to the Prague classification this distance in centimeter constitutes the C value that denotes the maximal length. Islands of squamous epithelium are not considered in the classification system.

Now we repeat the measurement from the gastric fold to the proximal end of the Barrett's epithelium. It measures 2 cm. According to the Prague classification this distance in centimeter constitutes the M value that denotes the maximal length of the Barrett's segment. All in all this Barrett's segment is classified as a C 1 M 2 Barrett's esophagus.

This is a second case of a patient with known Barrett's esophagus. The esophageal wall is widely capped with the metaplastic mucosa. Obviously this is a long-segment Barrett's esophagus as it exceeds 3 cm in length.

At the distal esophageal end we are passing a large hiatal hernia, which is clearly visible in inversion. The large hiatal hernia and the esophageal movement can make it difficult to locate the gastroesophageal junction. Do not confuse the diaphragmatic hiatal impression with the gastro-esophageal junction.

Start the measurement at the top of gastric mucosal folds. The gastric folds have to be evaluated in a deflated situation

Retract the endoscope to the most proximal point where the whole esophageal wall is circumferentially covered by Barrett's metaplasia. Classify this as the C-value of Barrett's esophagus in centimeters. Repeat the measurement for the most proximal metaplastic tongue and report it as M-value.

In this case we can define a C 5 M 6 Barrett's esophagus.

In the next step you should inspect the mucosa for potential dysplasia. Start with white light before using virtual chromoendoscopy.

In the last step you can use acetic acid to highlight the mucosal structure. Usually there is no need for a spraying catheter. Just position the scope at the proximal end of the Barrett's segment and flush the esophagus with 1% acetic acid through the working channel. After aspirating the air. In case of mucosa irregularities targeted biopsy samples should be performed. If no irregularities are identified 4 quadrant biopsy 4-quadrant-biopsies according to the Seattle protocol is recommended every 1-2 cm along the Barrett's segment.

Conflict of interest

The authors declare no conflict of interest related to the present article.

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References

- [1] Gatenby PA, Caygill CP, Ramus JR, Charlett A, Watson A. Barrett's columnar-lined oesophagus: demographic and lifestyle associations and adenocarcinoma risk. *Dig Dis Sci* 2008;53(5):1175-85.
- [2] Anaparthi R, Gaddam S, Kanakadandi V, Alsop BR, Gupta N, Higbee AD, et al. Association between length of barrett's esophagus and risk of high-grade dysplasia or adenocarcinoma in patients without dysplasia. *Clin Gastroenterol Hepatol*. 2013.
- [3] Sharma P, Dent J, Armstrong D, Bergman JJ, Gossner L, Hoshihara Y, et al. The development and validation of an endoscopic grading system for Barrett's esophagus: the Prague C & M criteria. *Gastroenterology* 2006;131(5):1392-9.
- [4] Koop H, Schepp W, Muller-Lissner S, Madisch A, Micklefield G, Messmann H, et al. Consensus conference of the DGVS on gastroesophageal reflux. *Z Gastroenterol* 2005;43(2):163-4.